

REMARKS

This Amendment is submitted in response to the Office Action mailed on July 12, 2005. Claims 1 - 29 and 31 - 34 were pending, and all stand rejected at present.

Claims 1, 10, 18 - 26, and 31 - 34 have been cancelled.

Claims 35 - 39 have been added. No additional fee is due.

OVERVIEW OF RESPONSE

Point 1

Several claims recite a "body" which is "radially outward" of a slot "exit." (for example, claim 5). "Radially outward" does not mean "farther from the motor axis." Instead, "radially outward" is determined based on a **single** radius. Thus, circle C1 in Sketch 1 below (page 13 of this Amendment) is "radially outward" of the EXIT. Circle C2 is not.

Point 2

Nutter may show a non-radial slot 17, but that slot does not separate two adjacent teeth, as the claims recite. (see, for example, claims 27 and 28.)

Point 3

Many claims recite a slot having a central axis which is **non-radial** and were rejected based on Hsu. (e.g., claim 11.) The Office Action asserts that Hsu shows such a slot, but no such slot has been identified in Hsu.

Point 4

Many claims recite a slot having a central axis which is **non-radial**, and were rejected based on Molnar. (e.g., claims 10 - 16.)

However, Molnar expressly calls his elements 62 in his Figure 3 "slots." Sketch 2 herein (page 18 of this Amendment) is a rendition of that Figure 3. Plainly, those elements 62 are symmetrical about radii of the motor. Consequently, the "central axis" AX1 lies along a radius, and is thus **NOT** "non-radial" as claimed.

Further, if sub-parts S2 or S3 of the element 62 are treated as the claimed "slots," they are still symmetrical about radii, and have central axes AX2 and AX3. Those "central axes" AX2 and AX3 lie along radii, and are thus **NOT** "non-radial" as claimed.

For the foregoing reasons, which are elaborated below, Applicants believe these claims are neither in view of nor anticipated by the references of record, whether taken alone or in combination.

RESPONSE TO 102 REJECTIONS OF CLAIMS 27 - 29

In paragraph 8 of the Office Action, the Examiner rejected claims 27 - 29 under 35 USC § 102(e) as being anticipated Nutter (U.S. 6,859,993). Applicants respectfully traverse the rejection for the following reasons.

Nutter discloses a permanent split capacitor electric motor is constructed by using existing components of a known shaded pole motor design to reduce engineering, tooling, inventory and other manufacturing costs of the new motor and, potentially, the known design through economics of scale. The alterations to the known motor principally involve different winding circuits and the addition of a capacitor. The new motor can be reversed with a single switch circuit.

Claim 27

Amended claim 27 recites:

27. (Currently amended) An electric motor, comprising:

- a) a first stator tooth having a first core;
- b) a second stator tooth having a second core;
- c) a an elongated space adjacent to and separating the first and second stator teeth and having
 - i) a radially innermost slot opening and
 - ii) a central axis which is non-radial;
- d) a body which is magnetically continuous with the first stator tooth, and has a radially inner surface which is radially outside said innermost slot opening.

The Office Action relies on Nutter's

- element 12 in his Figure 1 to show the claimed "first stator tooth,"
- element 13 to show the claimed "second stator tooth,"
- and
- slot 17 to show the claimed "space."

However, Nutter's slot 17 does not "separate" the "first and second stator teeth" as claimed. Instead, Nutter's slot 17 divides his tooth 12 into two parts. The purpose of that division-into-two-parts is believed to be to create a shaded pole.

Therefore, the claimed "space" between two teeth is not found in Nutter. MPEP § 2131 states:

A claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Further, Nutter's slot 17 separates **part of** his tooth 12 into two sub-teeth. Another, different, space (not labeled) separates his tooth 12 from tooth 13. That space does not correspond to the claimed space.

Claim 28

Amended claim 28 recites:

28. (Currently amended) An electric motor, comprising:
- a) a rotor;
 - b) a stator tooth having a radially inner face which includes
 - i) a first region of constant radius, and
 - ii) a circumferential boundary region to a slot opening that is not parallel to a radial line of said rotor wherein the slot opening separates the stator tooth from an adjacent stator tooth. (Emphasis added)

Applicants point out that even assuming arguendo that a wall of Nutter's slot 17 may be described as "not parallel to a radial line of said rotor" as in the claim. However, Applicants' claim recites slots which are between teeth and never mentioned a slot (like Nutter's) in a **single** phase. Therefore, Nutter fails to teach of such slots between teeth.

Claim 29

Claim 29 is a dependent claim and depends directly from claim 28, therefore, it is considered not anticipated by Nutter for the reasons mentioned earlier relative to claim 28.

RESPONSE TO 102 REJECTIONS OF CLAIMS 1 - 26 and 31 - 34

In paragraph 6 of the Office Action, the Examiner rejected claims 1 – 26 and 31 – 34 under 35 USC §102(e) as being anticipated by Hsu (U.S. Patent 6,566,784). Applicants respectfully traverse this rejection for at least the following reasons.

Hsu discloses a stator structure, which keeps a lower cogging torque in the rotation direction of a motor at the same time of raising the magnetic reluctance between adjacent tooth holders of the stator. A tooth-holding end of each of each of the tooth holders in the rotation direction of heavy load is reserved, while the other tooth-holding end in the reverse direction is cut, hence forming a single-arm tooth holder with two asymmetric sides. Because a higher magnetic reluctance is generated between adjacent single-arm tooth holders, the self coupling phenomenon of magnetic lines of force between adjacent tooth holders of the stator can be reduced when the magneto motor operates under a high load. Armature reaction of the magneto motor operating under a high load can thus be intensified to enhance the operational efficiency, stability, and smoothness thereof.

Claim 5

Claim 5(b) recites a particular "body:"

- b) a body located radially outward of the inner exit, which increases magnetic flux passing through the inner exit.

The specification, paragraph [0100], shows body 80 in Figure 22 and thereby provides one example of the claimed "body." Also, Figure 25 provides another example of the claimed "body," in element 190.

The Office Action asserts that the claimed "body" is shown by Hsu's "portion end of the tooth holder which is reserved." (Office Action, bottom of page 4.) Applicants interpret this assertion in the context of Hsu's column 2, lines 31 – 36, as will now be explained.

The teeth in Hsu's prior art Figure 1A are symmetrical and appear to be somewhat T-shaped. In contrast, the teeth in Hsu's Figure 2A appear to be L-shaped.

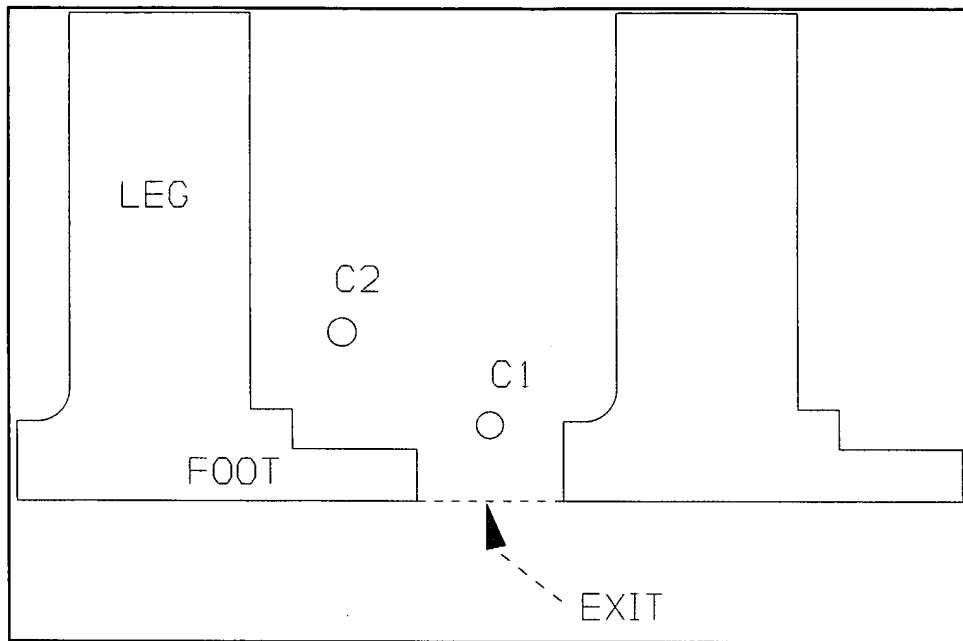
Hsu is apparently stating that to form the L-shaped teeth, part of the cross-bar of the T is "cut" (column 2, line 34) and the other part of the cross-bar is "reserved" (i.e., kept in place, or maintained: column 2, line 36.)

Applicants here introduce some definitions for convenience and understanding of Applicants' arguments.

- A "T" contains a "leg," which is the vertical line and a "cross-bar," which is the horizontal line.
- An "L" also contains a similar "leg." It also contains a "foot," which is the horizontal line.

Thus, under these definitions, the teeth in Hsu's Figure 2B resemble a foot 214, for example, at the end of a leg 215.

Sketch 1, below is a representation of Hsu's L-shaped teeth, showing the "leg" and "foot" just mentioned.



1Sketch 1

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The Office Action is asserting that Hsu's FOOT (shown as item 214 in Hsu's Figure 2B) qualifies as the claimed "body." However, Applicants respectfully submit that this interpretation is not correct.

The rejected claim 5(b) states that the "body" is "radially outward of the inner exit." If an "inner exit" is to be found in Hsu, then Applicants submit that this "exit" must be found at the location indicated in Sketch 1 above.

Now the problem can be seen. The FOOT in Hsu is not "radially outward" of the "exit" as claimed. "Radially outward" does not mean "farther from the center." Instead, "radially outward" is measured along a radius. For example, in Sketch 1 above, circle C1 would be "radially outward" of the "exit." Circle C2 is not. Therefore, the FOOT in Sketch 1 above, which is used to show the claimed "body," is not "radially outward" of the EXIT in the Sketch, as claimed.

For the foregoing reasons, the claimed "body" which is "radially outward" is not found in Hsu.

Claims 6 - 8

Claims 6 – 8 are dependent claims and contain limitations in addition to the limitations of the base claim and, therefore, are considered patentable for the reasons mentioned earlier.

Claim 9

Amended claim 9 depends from claim 5 and recites:

9. (Currently amended) The motor according to claim 5, wherein the body reduces cogging torque of the motor when no current is applied to the motor.

Hsu asserts that cogging torque is reduced **during operation**, which does not show claim 9 as claimed.

Claims 11, 12, and 16

As to claim 11, the Office Action asserts that the claimed "non-radial" "slot" is shown in Hsu's Figure 2A. However, such a slot has not been identified and Applicants can find no teaching in Hsu that the stator core comprises a slot having a central axis that is non-radial as claimed.

MPEP § 2131 states:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

37 CFR § 1.104(c)(2) states:

...

When a reference is complex or shows or describes inventions other than that claimed by the applicant, **the particular part relied on must be designated as nearly as practicable.**

The preceding also applies to claim 12. Claim 12 recites properties of the claimed "central axis."

- part of the central axis crosses a radius
- and
- another, radially outer, part is spaced from the radius.

Figure 26 of the Specification provides an example, where a radius 230 is shown. Central axis 225 crosses the radius 230 at point 235. At a radially outer region, central axis 225 is spaced from the radius 230, by distance D.

The Office Action asserts, without explanation, that Hsu's Figure 2A shows the claimed properties. Applicant can find no teaching in Hsu, as understood, that suggests or teaches of the elements of claim 12. Applicants respectfully request under 37 CFR §§ 1.104(c)(2) and 35 U.S.C. § 132, that the PTO specifically identify the elements of claims 11, 12 and 16 in Hsu.

Claim 13

Claim 13 recites: "b) a non-radial slot opening separating neighboring stator teeth." This also is not taught by Hsu as understood. Applicants request that this be identified.

Claims 14 and 15

Claim 14 recites:

14. (Original) The improvement according to claim 13, wherein the non-radial slot opening decreases mid-phase reluctance of the rotor, compared with a radial slot opening. (Emphasis added)

Hsu does not discuss the claimed decrease in reluctance. It appears the Examiner is relying on the doctrine of inherency.

MPEP § 2112 states:

EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE
TENDING TO SHOW INHERENCY.

In relying upon the theory of inherency, the examiner must provide a **basis in fact and/or technical reasoning** to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teaching of the applied prior art. (Emphasis added)

Applicants respectfully point out in the specification detailed examples of why the **non-radial** slot decreased reluctance. Because no analogous slot appears in Hsu, Applicants believe that a "basis in fact and/or technical reasoning" should be given, as required by this MPEP section because Applicants can find no teaching of this claimed feature in the Hsu reference.

Applicants respectfully reiterate this request as to claim 15.

Claim 17

As to claim 17, amended claim 17 recites:

17. (Currently amended) An electric motor, comprising:
- a) a rotor;
 - b) an array of stator teeth surrounding the rotor, each stator tooth separated from its neighbor by a non-radial slot opening, which slot opening has
 - i) one wall formed by a facet of one tooth; and
 - ii) another wall formed by a surface of an adjacent tooth. (Emphasis added)

Applicants cannot find any teaching of the two claimed "walls" in Hsu. Accordingly, Applicants respectfully submit that Hsu fails to teach of all the elements of Applicants' claim 17, and this claim should be allowed.

Other Claims

The remaining claims in this group, not discussed above, have been cancelled.

RESPONSE TO 102 REJECTION OF CLAIMS 10 - 16

In paragraph 7 of the Office Action, the Examiner rejected claims 10 – 16 under 35 USC 102(b) as being anticipated by Molnar (U.S. Patent 5,877,574). Applicants have cancelled claim 10 and respectfully traverse the rejection of claims 11 – 16 for the following reasons.

Molnar discloses a dynamoelectric machine having a rotor constructed to facilitate position sensing and a stator constructed to retain slot liners in the stator while reducing flux leakage between adjacent teeth of the stator. The rotor includes permanent magnets

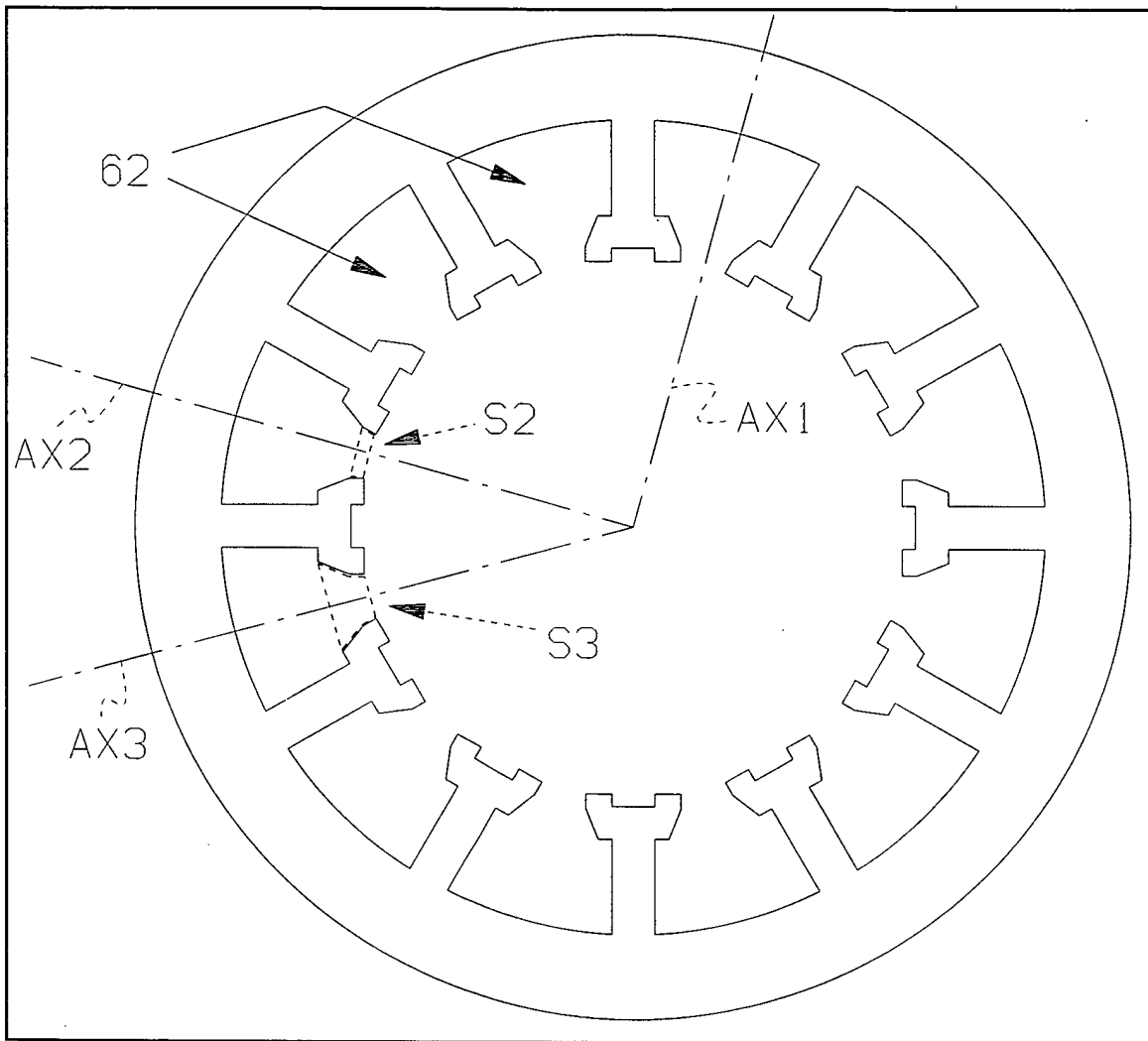
which project beyond one axial end of the rotor and the stator. Thus, a position sensor may be positioned in registration with the overhanging portion of the magnet. Slots in the stator are shaped to hold an insulating slot liner in the slot, and prevent the liner from slipping into the stator bore. The slots are also angularly formed near their inner ends to increase the space between adjacent stator teeth for reducing the flux leakage between the teeth.

Claims 11 and 13

Claim 11 has been amended as follows:

11. (Currently amended) ~~The improvement according to claim 10,~~
In an electric motor having a rotor, the improvement comprising:
a) stator coils, and
b) stator core means for decreasing mid-phase reluctance of the rotor,
wherein the stator core means comprises a slot having a central axis, and said
central axis is non-radial.

The Office Action relies on Molnar's Figure 3 to show the "non-radial" "central axis." Sketch 2 below is an annotated rendition of Molnar's Figure 3.

**2Sketch 2**

Molnar calls his items 62 in Sketch 2 "slots." (Column 4, line 29.) Plainly, the central axis of item 62 is axis AX1 in Sketch 2. AX1 clearly lies on a radius and is thus "radial." Thus, the central axis of slot 62 is clearly **NOT** "non-radial," as claimed.

If items S2 or S3 in Sketch 2 are instead treated as slots, a similar comment applies. The "central axis" of those supposed slots are axes AX2 and AX3, respectively. Those axes are also **NOT** "non-radial" as claimed. They are radial axes and lie on radii.

Therefore, Applicants submit that the claimed "non-radial" "central axis" is not found in Molnar. For the foregoing reasons, Applicants respectfully submit that claim 11 and claim 13, which depends from claim 11, are not taught by Molnar.

Claims 12 and 16

As to claims 12 and 16, claim 12 states:

- part of the central axis crosses a radius
- and
- another, radially outer, part is spaced from the radius.

Figure 26 of the Specification provides an example. Radius 230 is shown. Central axis 225 crosses the radius 230 at point 235. At a radially outer region, central axis 225 is spaced from the radius 230, by distance D. This limitation cannot be found in the axes AX in Sketch 2, above.

Molnar does not show this recitation. If the Examiner maintains the rejection, Applicants respectfully request that this recitation be identified in Molnar.

For the foregoing reasons, Applicants respectfully submit that claims 12 and 16, which depends from claim 13, are not taught by Molnar.

Claims 14 and 15

These claims recite a decrease in reluctance and cogging torque because of the non-radial slot.

Applicants point out that the specification provided detailed examples of why the non-radial slot decreased reluctance. There is no teaching in the cited references that suggests an analogous slot that reduced reluctance. No analogous slot appears in Hsu. If the Examiner maintains this rejection, Applicants respectfully request that a "basis in

fact and/or technical reasoning" that teaches should be given, as required by MPEP § 2112, cited above.

RESPONSE TO 112 – OBJECTIONS

In paragraph 4 of the Office Action, the Examiner objected to claims 1, 5, 13 - 17, and 22 because of the terms "radial slot opening" and "non-radial slot opening." In view of the claims as now presented and for the reasons mentioned herein, Applicants believes these claims are now in good form.

Applicants respectfully traverse the Examiner's interpretation, given on page 3, section 4, of the Office Action. Applicants cannot understand the interpretation and respectfully request clarification.

Applicants respectfully direct the Examiner's attention to the slot in Figure 11, having width 74, has an opening, or exit which faces point P1. That exit can be said to be "radially facing," and "facing" "inward." Obviously, if the rotor were outside the stator, the exit would "face" "outward." The slot being elongated can be said to extend "along a radius," or be "radially extending."

Applicants point out that claim 5 does not contain these phrases. Claim 5 does contain the phrase "stator slot having a radially inner exit." That phrase is explained in the Specification, paragraph 102, which is copied here:

Figure 23 illustrates the slot 75 of Figure 11. Slot 75 runs along a radial axis 180, and has a **radially inner mouth, exit,** or opening, indicated by dashed box 175.

The specification, claims as originally filed, and drawings thus describe the radial slot opening and non-radial slot opening. As to the other claims, it is believed that amendments have removed any basis for objection.

RESPONSE TO OBJECTION TO THE DRAWINGS

In paragraph 3 of the Office Action, the Examiner objected to the drawings. Applicants believe this amendment has removed the basis for the objection based on claim 27. Applicants point out that the "core" is the iron body forming the tooth, around which wires are wound. Elements 80 in Figure 13 illustrate two cores.

RESPONSE TO OBJECTION TO THE SPECIFICATION

In paragraph 2 of the Office Action, the Examiner objected to the disclosure for various informalities. Applicants have amended the specification as shown and believe it is now in good form.

ADDED CLAIMS

Applicants have added new claims 35 – 29 to further focus on various features of Applicants' invention.

Claim 35

Claim 35 recites a void, such as void 195 in Figure 25, and an adjacent tooth within the void, such as in Figure 13. (In Figure 13, the void would be defined between a tooth and the rotor, as in the claim.)

The references of record do not show this.

Claim 36

Claim 36(b) recites:

- b) a slot between each pair of neighboring teeth, which slot
 - i) is bordered by one surface on each tooth; and

- ii) has a central axis, midway between the surfaces, which is non-radial.

The references of record do not show this.

Claim 37

Claim 37 recites slot having a V-shaped cross section. Figure 13 provides an example.

The references of record do not show this.

Claim 38

Claim 38 recites a clockwise and counterclockwise extension on each tooth. Also, the extensions overlap.

The references of record do not show this.

Claim 39

Claim 39 depends from claim 38, and recites:

wherein each extension A cooperates with a neighboring extension B to form an elongated slot having a central axis which is non-radial.

The references of record do not show this.

CONCLUSION

Applicants express thanks to the Examiner for the careful consideration given to this case.

For all the foregoing reasons, Applicants respectfully request that the rejections to the claims be reconsidered and withdrawn.

Applicants are filing concurrently herewith a request for a three-month extension of time.

The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to **Deposit Account No. 50-1287**. Applicants hereby provide a general request for any extension of time which may be required at any time during the prosecution of the application. The Commissioner is also authorized to charge any fees which have not been previously paid for by check and which are required during the prosecution of this application to **Deposit Account No. 50-1287**. (Should Deposit Account No. **50-1287** be deficient, please charge any further deficiencies to Deposit Account No. 10-0220.)

Applicants invite the Examiner to contact the undersigned via telephone with any questions or comments regarding this case. **APPLICANTS RESPECTFULLY REQUEST AN INTERVIEW WITH THE EXAMINER IF THIS AMENDMENT DOES NOT PLACE THIS CASE IN CONDITION FOR ALLOWANCE.**

Reconsideration and favorable action are respectfully requested.

Respectfully submitted,

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